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Research-in-Progress

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Abstract

Mobile games dominate the mobile app markets and contribute over half of the mobile app revenues. In order to attract more users and generate higher revenues, the platforms such as Apple iOS and Google Android, would like to partner with the game developers and have the developers exclusively stay at their own platforms to entice more consumer demands. For example, the game developer "Electronic Arts" agrees to offer Apple iOS a two-month exclusive window for the well-known mobile game "Plants vs. Zombies 2". The benefits of the exclusivity to the platforms and app developers are unclear and not studies in the literature. This study aims (1) to provide managerial insights for the platforms and app developers, and (2) to analyze the pros and cons of the partnership strategy, e.g. when offering an exclusive deal, how do the platforms and developers maximize the corresponding profits by the exclusive deal, and what is the optimal exclusive duration?

Keywords: Mobile platform, exclusivity, two-sided market, network externalities

Introduction

The gaming market has become extremely huge and popular along with the development of the information technology. It still, obviously, has great potential for future growth, especially for mobile games. Evidences also show that the mobile games market is growing drastically. For example, App Annie (2015) reports that the game firms dominate its list of the top grossing app publishers for both iOS and Android platforms in 2014. The time spent with apps accounts for over half of time with digital media, and furthermore, 32% of time spent with apps is being spent on gaming (Shields, 2014). Apparently, people spend most of their time on gaming when using mobile phones. The market is expected to grow by additional 51% in North America, 47% in Western Europe, and 86% in China (Gaudiosi, 2015). According to Newzoo's report, the global market size in 2014 further reaches $25 billion, which is increased by 43% over the mobile game revenues in 2013 (Gaudiosi, 2015).

For the mobile game industry, platforms such as Apple and Google attempt to gain exclusivity on titles for their own platforms so as to attract users to the platforms and sell more devices. For example, Apple approaches the top game developer "Electronic Arts" about making an exclusive deal. Electronic Arts ends up with agreeing to offer Apple two-month exclusivity windows for *Plants VS Zombies 2* and then on Android after that (Newman,2014; Reisinger,2014). Apple can thus drive the demand for its platform during these two months. More examples can be found on both Google Android and Apple iOS. For example, Square Enix provides Google Android with one-month exclusive accesses for both *Final Fantasy VI* and *Gree's Rage of the Immortals* (Newman, 2014). ZeptoLab's *Cut the Rope 2* have a three-month head start on Apple's platform (Newman, 2014).

For game developers, there is a tradeoff between offering an exclusive deal and staying multi-homing. If game developers chooses to make limited-time with a platform, they may lose the user demand from the other competing platforms during the period of exclusivity. On the other hand, multi-homing developers are required to spend extra costs such as porting and migration to make their games available to different platforms. Similarly, exclusivity is also a tradeoff for platforms. The tradeoffs drive us to pose this question: is gaining exclusivity on mobile games is profitable for platforms and developers? If yes, how long should developers take to keep the exclusivity on a single platform? And what is the optimal timing for developers move to the other platforms after the exclusivity?

The purpose of the research is to build an analytical model to examine the exclusivity in the mobile game industry. We aim to provider managerial insights for game developers as well as platforms so that they are able to develop the business strategies. Our research goals include building an analytical model, finding the incentives and managerial insights. In our future research, we plan to collecte real industrial data and empirically verify our proposed model. The remainder of the paper is organized as follows. Section 2 lists the related work to our study. Section 3 outlines the stylized analytical models of exclusivity and investigates the profitability for platforms and game developers. Section 4 concludes the paper by summarizing the managerial insights of our analyses and providing some possible directions for future research.

Related Work

The mobile game market is a typical two-sided market. The concept of two-sided market is originated from the research on "two-sided matching markets", which studies a function of market that match one type of agent with another. Gale & Shapley (1962) are of the earliest researchers who study the two-sided matching model. They analyzed college admissions and marriage, and showed that there is always a stable matching status. Although they did not give the definition of two-sided market, the idea of this type of markets was first introduced into the economic area. Demange & Gale (1985) provided a model that describes two-sided matching market. In a matching market, agents are buyers and sellers (or firms and workers, or men and women) who form partnerships based on satisfaction and make pecuniary transactions. Examples of matching markets are housing market, academic markets and marriage markets. These markets still are the traditional tangible markets with both sides of transaction, which seem to have a unilateral market structure. However they actually have strict two-sided matching market form, although people focus on the platform less than the two sides of agents and consequentially the two-sided aspect of the transaction is less obvious. With the emergence of the housing agents, labor mediation and marriage intermediaries, the nature of these two-sided markets become clearer. Armstrong & Wright (2004; 2007), Armstrong (2006) and focus on competition between platforms.

Our study is also highly related to the work of Cheng & Liu (2012). They explore the optimal trail time for time-locked version software. A framework is built to help make the binary decision between limited function version and time-locked version for software providers. Cheng & Liu (2012) prove the existence of the threshold of the variable for the binary decision and determine its value.

The Model

Adopting the works of Armstrong & Wright (2004) and Armstrong (2006), we consider one developer, providing a game to two competing platforms, A and G (as shown in Figure1). The developer chooses whether to offer an exclusive deal to platform A or not. If an exclusive deal is offered, the developer will not partner with platform G until the end of the exclusivity. Consumers join either Platform A, or Platform G. We assume that the developer and Platform A and G are rational and all seek the maximum profits, and that each consumer will not play the game until purchasing it.

Following the model setup in Cheng & Liu (2012), let the duration of the exclusivity be denoted by τ. Without loss of generality, τ is normalized between 0 and 1 by splitting the exclusive time by the expected life span of the game. The platforms receive payments from consumers, and both of the platforms charge consumers price p for access. The notation Q_τ represents the network size of the game, that is, the install base or the number of users that purchase the game given that the the length of the exclusivity time is τ. Each consumer's valuation θ is increased by network externality γQ_τ, where γ is the network effect intensity and captures the willingness to pay as an extra consumer takes part in the network. Table 1 provides a list of notations.

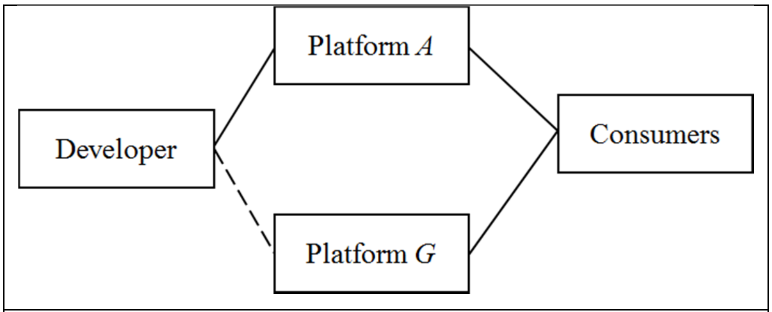

Figure 1. Market Structure

Cheng & Liu (2012) also consider the functionality of the software. Of course, mobile games can be regarded as one type of software. However, for gamers, the functionality of the game should be utility and entertainment. We revise the model of Cheng & Liu (2012) a little bit by changing the software functionality s to the game utility μ, i.e., each consumer has prior belief μ about the utility of the game before purchasing. Basic speaking, consumers are initially inexperienced in a new game's settings and control system. But they become more and more familiar and thus increase their utility after playing for periods of time. Let δ capture the increment of the utility of the game per unit of time, and each consumer's perceived utility about the game after playing for the exclusive time τ is $\mu + \delta\tau$. A consumer obtains the following net utility after purchasing the game:

$$\mathrm{U} = (\theta + \gamma Q_\tau)(\mu + \delta\tau) - p - c \tag{1}$$

where c is the aggregate cost spent by consumers to play the game, including acquiring a mobile device, setting up the game deployment and soon. The first term $\theta + \gamma Q_\tau$ describes the network effect, while the second term $\mu + \delta\tau$ captures each consumer's perceived utility about playing the game. We further discuss the two cases in the following section.

Table 1. Summary of Notations	
p	Price of the game
τ	Duration of the exclusive deal, $\tau \in [0,1]$
Q_τ	Network size of the game
γ	Network effect intensity
μ	Consumer's utility before purchasing
δ	Increment of the utility of the game per unit of time
c	Consumer's aggregate cost to play the game, e.g. effort cost
c_p	Developer's cost when porting to another platform
θ	Consumer type

Table 1. Summary of Notations

Case D: the Developer Leads the Exclusivity

We first discuss the scenario where the developer leads the exclusivity. As shown in Figure 2, the developer offers an exclusive deal to Platform A. The exclusive deal is sustained for τ units of time. We let θ_τ denote the marginal consumer type who is indifferent between the exclusive deal and non-exclusive for the period $[0, \tau]$, and let θ_0 denote the same consumer type as the exclusive deal is not offered. The developer changes to release the game across two platforms after exclusive time τ. The developer is required to spend more porting and developing cost c_p for simultaneously staying at two platforms even though it is able to entice more demand from Platform A and G. Figure 2 also demonstrates total consumer demand as the shadow region, i.e. $Q_\tau = 1 - \tau\theta_\tau$. The developer seeks to set one decision variables, the price of the game p, to maximize the profit as follows:

$$\max_p \pi_D = \mathrm{p} \cdot Q_\tau - \mathrm{c_p} \tag{2}$$

subject to

$$0 \leq Q_\tau \leq 1 \quad (3)$$

$$p \geq 0 \quad (4)$$

Eq. (2) describes the developer's profit function. Inequality (3) ensures the demand is nonnegative and no larger than the total number of consumers. Inequality (4) requires that the price p be nonnegative.

Recall that θ_τ represents the marginal consumer who is indifferent between purchasing the game or not. Setting the net utility function in Equation (1) to zero, we derive the marginal consumer type as $\theta_\tau = \frac{p+c}{\mu+\delta\tau} - \gamma Q_\tau$. Hence, the demand for the game is described by $Q_\tau = 1 - \tau\theta_\tau$. Substituting $\theta_\tau = \frac{p+c}{\mu+\delta\tau} - \gamma Q_\tau$ into the demand function, we derive the demand of the game as $Q_\tau = \frac{\mu+\delta\tau-\tau(p+c)}{(1+\tau\gamma)(\mu+\delta\tau)}$. Then the above problem conducts the optimal price $p_D{}^* = \frac{1}{2}(\frac{\mu}{\tau} + \delta - c)$ and the optimal profit $\pi_D{}^* = \frac{1}{4}\frac{(\mu+\delta\tau-\tau c)^2}{\tau(1-\tau\gamma)(\mu+\delta\tau)} - c_p$. After examining the optimal profit, we obtain the following proposition.

Proposition 1. For the whole life span of a game, the developer tends to release it across two platforms rather than offer an exclusive deal to only one platform.

Proof. Please see the appendix.

Proposition 1 shows that the developer's optimal strategy. We find that the developer is able to obtain the optimal profit as she chooses not to join Platform A right in the beginning of releasing the game, i.e. $\tau = 0$. We further discuss the second scenario and Platform A's best strategy in the next section.

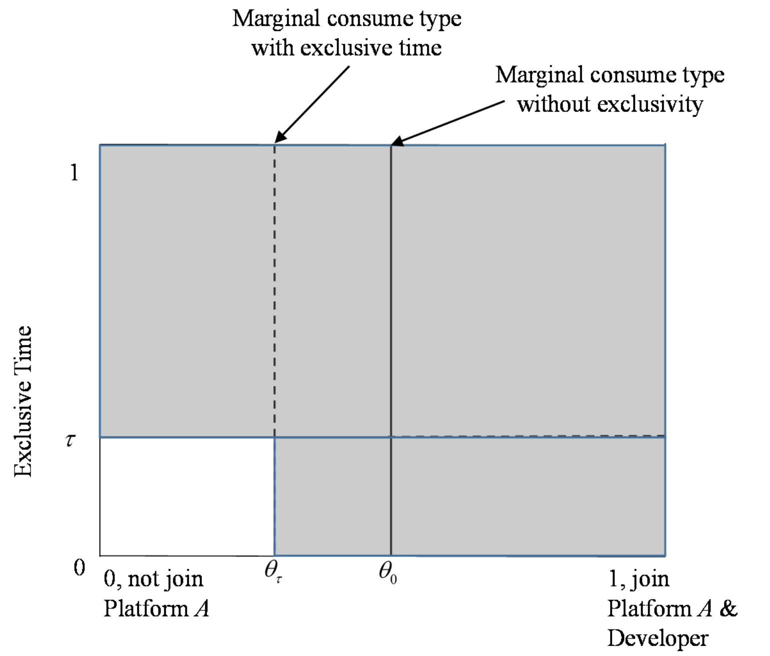

Figure 2. Distribution of Potential Consumers in Case D

Case A: Platform A Leads the Exclusivity

We then discuss the scenario where Platform A leads the exclusivity. Because of high cost of devices, we note that most consumers may not purchase another device if they have already had one. It is very easy to observe the phenomenon in the mobile phone market. Hence, we assume that if consumers choose to join a platform in the beginning, they will keep staying at the same platform until the end of the life span. Figure 3 shows the consumer distribution for the case, i.e. $Q_\tau = 1 - \theta_\tau$. The. The profit maximization problem is as follows:

$$\max_p \pi_A = p \cdot Q_\tau \quad (5)$$

subject to

$$0 \leq Q_\tau \leq 1 \quad (6)$$

$$p \geq 0 \quad (7)$$

Eq. (5) describes the developer's profit function in Case E. Inequality (6) ensures the demand is nonnegative and no larger than the total number of consumers. Inequality (7) requires that the price p be nonnegative. The above problem conducts the following optimal price $p_A{}^* = \frac{1}{2}(\mu + \delta\tau - c)$ and profit of game $\pi_A{}^* = \frac{1}{4}\frac{(\mu+\delta\tau-c)^2}{(1-\gamma)(\mu+\delta\tau)}$. We obtain Proposition 2 after examining the optimal profit.

Proposition 2. In order to obtain the maximum profit, Platform A's best strategy is to keep the developer staying at its own platform.

Proof. Please see the appendix.

Proposition 2 shows that the developer's optimal strategy. The profit of Platform A and the duration of the exclusive deal is positively related so that the profit for Platform A is maximized when the game is totally exclusively released to it, i.e. $\tau = 1$.

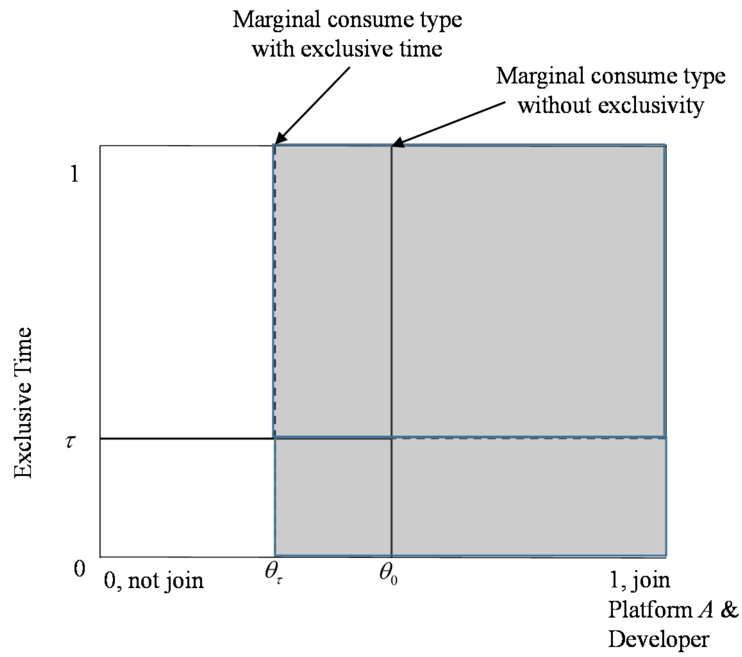

Figure 3. Distribution of Potential Consumers in Case A

Conclusion

The purpose of the research is to build an analytical model to examine the exclusivity in the mobile game industry. Our preliminary result shows that platforms prefer making an exclusive deal while developer prefers staying across different platforms. We find that platforms and developers have the totally different preferences for the duration of the exclusivity. However, a game can only begin to make profit after platforms and developers making an agreement in the duration of exclusive deal. We plan to further explore the interactions between platforms and developers in the game to make exclusive time decisions. For example, developers and platforms negotiate the optimal exclusive period of time.

Extending previous analytical models into the two-sided mobile game market, we find that the two user groups have the completely opposite preferences when they pursue their own maximizing profits, where the platforms in the market prefer an exclusive deal while the developers in the prefer multi-homing deal. Accordingly, the agreement in the duration of exclusive deal is significant for both of the two user groups by knowing the other user group in this two-sided market having a completely opposite preference and rationally pursuing its own optimal decision.

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Appendix

Proof of Proposition 1.

For the given duration of the exclusive deal (τ), when the duration of the exclusive deal τ approaches 0, the developer's optimal profit tends to be infinity, where $\lim_{\tau \to 0^+} \pi_D{}^* = \infty$. We find that profit for developer is maximized when the duration of the exclusive deal tends to 0.

Proof of Proposition 2.

For the given duration of the exclusive deal (τ), both price (p) and demand (Q_τ) are monotonically increasing functions of the duration of the exclusive deal (τ), where $p_A{}^* = \frac{1}{2}(\mu + \delta\tau - c)$ and $Q_\tau = \frac{(\mu+\delta\tau-p-c)}{(\mu+\delta\tau)(1-\gamma)} = \frac{(\mu+\delta\tau-c)}{2(\mu+\delta\tau)(1-\gamma)} = \frac{1}{2(1-\gamma)}\left(1 - \frac{c}{(\mu+\delta\tau)}\right)$. We find that the exclusive game enable Platform A to the charge the highest price with the largest demand. That is, $\max_\tau p^* = \frac{1}{2}(\mu + \tau - c)$ and $\max_\tau Q_\tau{}^* = \frac{(\mu+\delta-c)}{2(\mu+\delta)(1-\gamma)}$, resulting in the maximized profit $\pi_D{}^* = \frac{1}{4}\frac{(\mu+\delta-c)^2}{(1-\gamma)(\mu+\delta)}$.